

PROCESS CONTROL UNITS
mL-PIDC6 & mL-PIDC8



mL-PIDC6 & mL-PIDC8 Universal Input PID Process Controllers

- 4 digits process (PV) ve 4 digits process set (SV) display
- Universal process input(TC, RTD, mV \approx , V \approx , mA \approx)
- Optional secondary sensor input
- Dual or multi point calibration for \approx voltage & \approx Current input
- Configurable ON/OFF, P, PI, PD and PID control forms
- Auto-tune and Self-tune PID
- Manual/Automatic mode selection for control outputs
- Bumpless transfer
- Motorized valve control function
- Programmable heating, cooling and alarm functions for control outputs
- 8 steps profile control (Ramp & Soak) function and start-holdstop by using logic input module
- Remote set point function by using analogue input modules
- Re-Transmission
- Detection of heater failure by using 0...5 A \sim CT input module
- RS-485 serial communication with Modbus RTU protocol

SPECIFICATIONS:

Process Inputs

Universal Input: Universal input, TC, RTD, \approx Voltage/Current Thermocouple (TC) : L(DIN 43710) ,J , K , R , S , T , B , E ve N (IEC584.1)(ITS90) ,C (ITS90)
Thermoresistance (RTD): PT-100 (IEC751)(ITS90)
 \approx Input : mV, V, mA

Measurement Range: Please refer to Table-1 for selection of input type and scale.

Accuracy: $\pm 0,25\%$ of full scale for thermocouple, thermoresistance and voltage

Cold Junction Compensation: Automatically $\pm 0,1^\circ\text{C}/1^\circ\text{C}$.

Line Compensation: Maximum 10 Ohm

Sensor Break Protection: Upscale

Sampling Cycle: 3 samples per second

Input Filter : 0.0 ile 900.0 seconds

CONTROL

Control Forms: Programmable ON / OFF, P, PI, PD or PID.

OUTPUT

Standard Relay Output : 5A@250V \sim (Programmable control or alarm output) (Electrical Life : 100.000 Operation (Full Load))

Extra Relay Output

-3A@250V \sim Relay Output

ADDITIONAL INPUT

Extra Analog Input

-0/4...20 mA \approx Current Input

Supply Voltage

100-240V \sim 50/60 Hz (-%15;+%10) -6VA

INDICATORS

Process Indicators :

mL-PIDC6 : 10.1 mm Red 4 digit LED Display
mL-PIDC8 : 13.2 mm Red 4 digit LED Display

Setpoint Indicators :

mL-PIDC6 & mL-PIDC8 : 8 mm Green 4 digit LED Display

LED Indicators : AT(Auto Tuning), SV(Set Value), Man(Manual Operation),Auto(Auto Operation), O1/2/3 (Output status Leds), °C, °F, V, Ramp and Remote LEDs

Environmental Ratings and Physical Specifications

Operating Temperature: 0...50°C

Max. Operating Humidity : 0-90%RH (non-condensing)

Protection Class : NEMA 4X (IP65 at front, IP20 at rear).

Mounting: Type-1 Enclosure Mounting

Installation: Fixed installation Category II

Over Voltage Category: II

Pollution Degree: II, office or workplace, none conductive pollution

Weight:

mL-PIDC6 & mL-PIDC8 : 260 gr.

Dimensions / Panel Cut-Out:

mL-PIDC6 : (48 x 96mm, Depth: 86.5 mm) / (46 x 92mm)

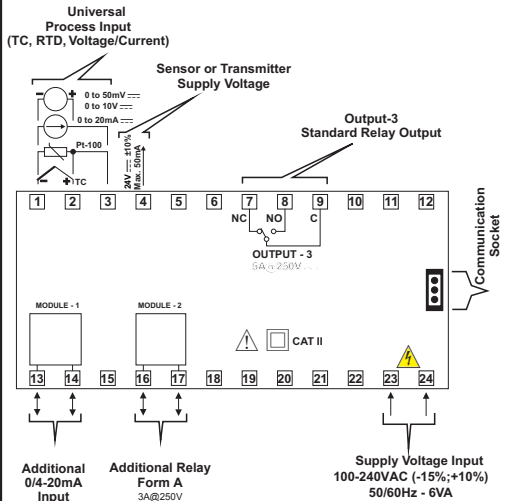
mL-PIDC8 : (96 x 48mm, Depth: 86.5 mm) / (92 x 46mm)

Minimum Distance Between Panel Cut-Out Centers:

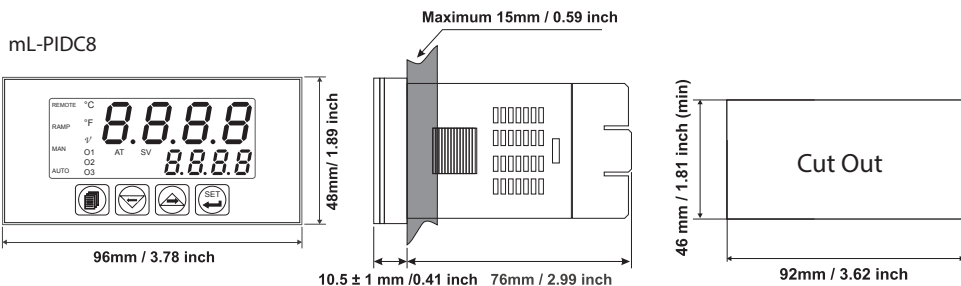
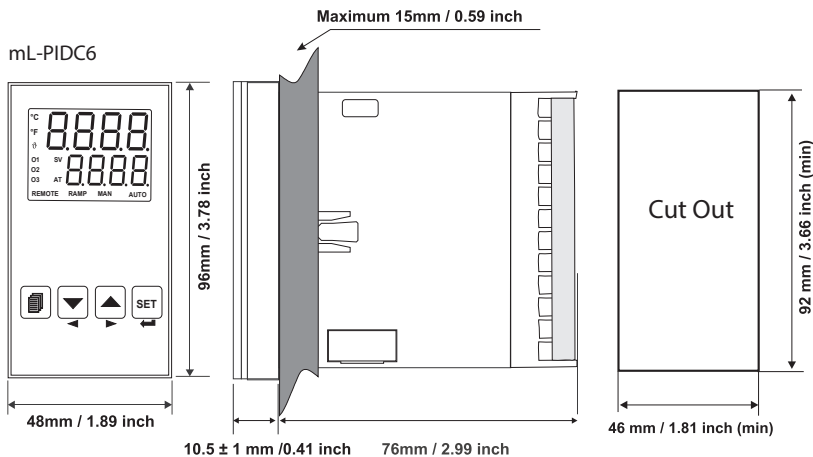
mL-PIDC6 : X=65mm, Y=129mm

mL-PIDC8 : X=129mm, Y=65mm

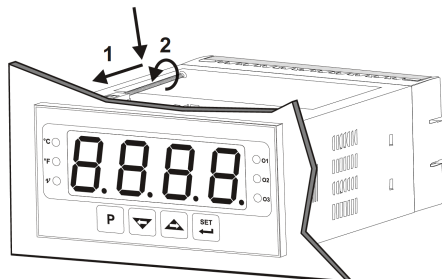
Electrical Connections



DIMENSIONS



PANEL MOUNTING



The unit is designed for panel mounting.

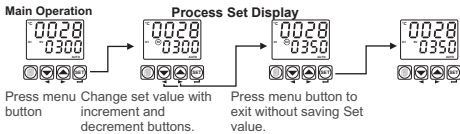
1-Insert the unit in the panel cut-out from the front side.

2- Insert the mounting clamps to the holes that located top and bottom sides of device and screw up the fixing screws until the unit completely immobile within the panel

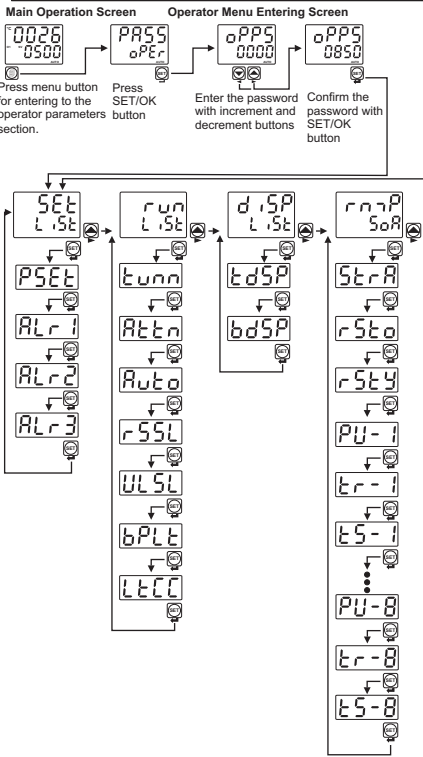


Mounting of the unit to a system must be done with it's own fixing clamps. Do not do the mounting of the device with inappropriate fixing clamps. Be sure that device will not fall while doing the mounting process.

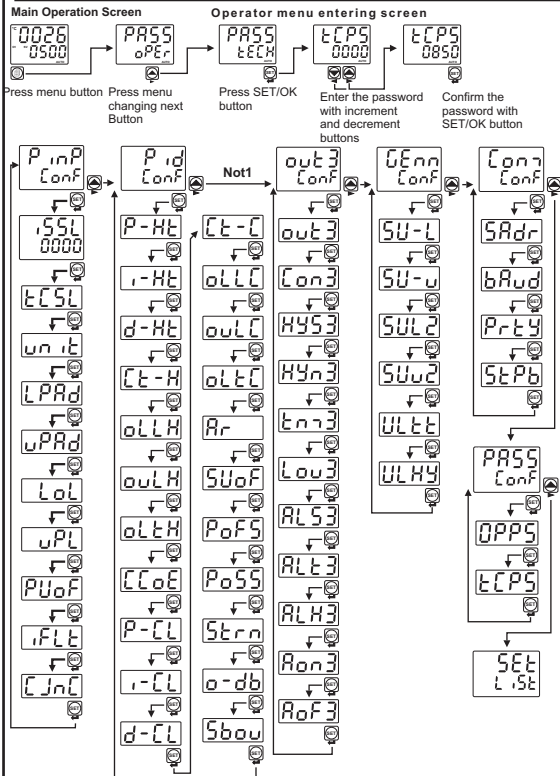
Adjustment of Process Set Value



Easy Access Diagram for Operator Parameters



Easy Access Diagram for Technician Parameters



Set LiSt: Set values

- PSEt** Proses Set (-1999,9999)Unit
- ALr1** Alarm-1 Set (-1999,9999)Unit
- ALr2** Alarm-2 Set (-1999,9999)Unit
- ALr3** Alarm-3 Set (-1999,9999)Unit

Run LiSt: Selection of PID Tune and Operation Form

- t.unn** **TUNE SELECTION** By selecting one of the methods below, device can determine the PID parameters.
- no Device operates according to the defined PID
 - A.ten** **Auto tune** (Limit Cycle Tuning) operation
 - S.ten** **Self tune** (Step Response Tuning) operation
 - r.SSL** **Auto-Self Tune** Self Tune operation is performed, if the conditions are realized when power on firstly. In normal operation, it controls the tune conditions in **Auto Tune** selection which explained below. If any of the conditions is realized, it performs the **Auto Tune** operation
 - A.ten** **AUTOMATIC TUNE SELECTION**
 - no Device does not do (Limit Cycle Tuning) operation
 - r.CS** Device does (Limit Cycle Tuning) operation

o.uEtO OPERATION FORM SELECTION

- P.uEtO** Automatic: The device automatically calculates the %output
- m.nAn** Manual: %output rate can be controlled manually by using direction buttons.
- r.SSL** **Ramp/Soak Control**
 - oFF Ramp/Soak function is deactivated
 - r.un** Ramp/Soak function is active
 - H.oLd** Ramp/Soak function is holding. Real time is stopped

ULSL MOTORIZED VALVE CONTROL

- no Motorized valve control is deactive
- r.CPS** Motorized valve runs with heating PID function.
- C.oE** Motorized valve runs with cooling PID function.

b.PLT BUMPLESS TRANSFER

- no Process output value in manual control is not taken into consideration while passing from manual control to automatic control. New control output that is measured in automatic control is applied to process output. Last %output value is taken output value of manual control and manual control continues while passing from automatic control to manual control

5Errn

PROCESS VALUE STABILIZATION (1, SCALE HIGH POINT)Unit

It is used for controlling if process value oscillates or not when $\overline{E_{unn}}$ Parameter is $\overline{R_{Eun}}$ or $\overline{R_{ESE}}$ If: $\overline{PSE} - \overline{SErn} \leq$ Process Value $\leq \overline{PSE} + \overline{SErn}$ condition is not true, then device start tunn operation

SCALE LOW POINT : Minimum process input value in Pt-100 and Tc inputs. -1999 for fixed dual point display adjustment used inputs, Scale low point is the lowest one from $\overline{L_{POL}}$ or $\overline{L_{POH}}$ for selectable dual point display adjustment used inputs Scale low point is the lowest one from $\overline{P_{o0}}$ or $\overline{P_{o1}}$ for multi point display adjustment used inputs

SCALE HIGH POINT : Maximum process input value in Pt-100 and Tc inputs. 9999 for fixed dual point display adjustment used inputs, Scale high point is the biggest one from $\overline{L_{POL}}$ or $\overline{L_{POH}}$ for selectable dual point display adjustment used inputs Scale high point is the biggest one from $\overline{P_{o0}}$ or $\overline{P_{o1}}$ for multi point display adjustment used inputs

o-db

PROPORTIONAL BAND SHIFTING ((-SCALE HIGH POINT / 2) , (SCALE HIGH POINT / 2))Unit

If cooling function is performed ;
Cooling process set value is calculated by adding set value \overline{PSE} With parameter $\overline{o-db}$
Control form can be ON/OFF or PID.

If set value for heating = $\overline{PSE} + \overline{SVoF}$;
Then set value for cooling = $\overline{PSE} + \overline{SVoF} + \overline{o-db}$

5bov

SENSOR BREAK OUTPUT VALUE (FOR HEATING PID 0.0, 100.0)% (FOR COOLING PID -100.0, 0.0)%

When sensor breaks, controlling of the process can continue by entering %output value to $\overline{5bov}$ parameter.
If this parameter 0.0, process control output does not perform an output when sensor breaks.

IO P1 ConF: MODULE-2 Configuration Parameters

i These devices are equipped with an additional Relay Output plugged into Module-2 socket.

$\overline{out2}$ Defines output function for Module-2

- \overline{HEAT} Heating
- \overline{COOL} Cooling
- \overline{LOUT} Logic output

$\overline{Con2}$ It is active if output function of Module-1 is heating or cooling.

- \overline{onof} ON/OFF
- \overline{PID} PID

$\overline{HYS2}$ Hysteresis value for OUT-2. It can be adjusted from 0% to 50% of defined scale. (It is active if ON/OFF control is selected.)

$\overline{HYn2}$ It determines operation form of hysteresis. (ON/OFF)

- $\overline{0000}$ SV + HYS/2 and SV - HYS/2
- $\overline{0001}$ SV and SV+HYS or SV and SV-HYS

$\overline{tnr2}$ In ON/OFF operation, this time must be passed for the output to be

$\overline{LOU2}$ logic output function of output module in Module-2
It is active if output function of Module-2 is Lout (Logic Output)

- Alarm output
- $\overline{0000}$ Manual /Automatic data output
 - $\overline{0001}$ Sensor break alarm output
 - $\overline{0002}$ Output is active when the process value is out of the band which is defined with minimum value of operating scale $\overline{L_{oL}}$ And maximum value of operating scale $\overline{L_{oH}}$
 - $\overline{0003}$ Output indicates that Ramp/Soak function has finished

$\overline{0004}$ Sensor break alarm output for analog input module in Module-1 socket. (It is visible if one of analog input modules is plugged in Module-1 socket)

$\overline{0005}$ If process value is less than minimum value of operating scale for analogue input module in Module-2 socket or greater than maximum value of operating scale for analogue input module in Module-2 socket, process output becomes active.(This parameter is visible if one of the analogue input modules is plugged in Module-2 socket)

$\overline{RLS2}$ Measurement input selection for Module-2 alarm output.
This parameter is visible if Logic output function of Module-2 is Alarm output and one of the analogue input modules is plugged in Module-1 socket

- $\overline{0000}$ Alarm output runs according to the process input.
- $\overline{0001}$ Alarm output runs according to the analogue input module (2nd sensor input) in Module-1 socket

$\overline{RL22}$ MODULE-2 alarm

It determines alarm type. It is active if logic output function of Module-1 is an alarm output.

- $\overline{0000}$ Process high alarm
- $\overline{0001}$ Process low alarm
- $\overline{0002}$ Deviation high alarm
- $\overline{0003}$ Deviation low alarm
- $\overline{0004}$ Deviation band alarm.
- $\overline{0005}$ Deviation range alarm
- $\overline{0006}$ Heater failure alarm does not apply on these devices

$\overline{RLH2}$ MODULE-2 Alarm-2 hysteresis value.

It is active if logic output function of Module-2 is an alarm output.

$\overline{Ron2}$ Alarm on delay time (0, 9999)Seconds

It is active if logic output function of Module-2 is an alarm output

$\overline{ROF2}$ Alarm off delay time (0, 9998)Seconds

Alarm off delay time. It can be adjusted from 0000 to 9998 seconds. When the value is greater than 9998 $\overline{L_{LCH}}$, is seen on the display. It means alarm latching output is selected.

ioP1 ConF: MODULE-2 Configuration Parameters

- ① These devices are equipped with an additional Relay Output plugged into Module-2 socket.

out 2 Defines output function for Module-2

HEAT Heating
COOL Cooling
LOUT Logic output

CON 2 It is active if output function of Module-1 is heating or cooling.

ONOFF ON/OFF
PID PID

HYS 2 Hysteresis value for OUT-2. It can be adjusted from 0% to 50% of defined scale. (It is active if ON/OFF control is selected.)

HYN 2 It determines operation form of hysteresis. (ON/OFF)

0000 SV+HYS/2 and SV-HYS/2
0001 SV and SV+HYS or SV and SV-HYS

EN 2 In ON/OFF operation, this time must be passed for the output to be

LOUT logic output function of output module in Module-2

It is active if output function of Module-2 is Lout (Logic Output)

Alarm output

0000 Manual /Automatic data output
0001 Sensor break alarm output
0002 Output is active when the process value is out of the band which is defined with minimum value of operating scale

And maximum value of operating scale LOUT

0004 Output indicates that Ramp/Soak function has finished

0005 Sensor break alarm output for analog input module in Module-1 socket. (It is visible if one of analog input modules is plugged in Module-1 socket)

0006 If process value is less than minimum value of operating scale for analogue input module in Module-2 socket or greater than maximum value of operating scale for analogue input module in Module-2 socket, process output becomes active.(This parameter is visible if one of the analogue input modules is plugged in Module-2 socket)

AL 5 Measurement input selection for Module-2 alarm output.

This parameter is visible if Logic output function of Module-2 is Alarm output and one of the analogue input modules is plugged in Module-1 socket

0000 Alarm output runs according to the process input.
0001 Alarm output runs according to the analogue input module (2nd sensor input) in Module-1 socket

AL 2 MODULE-2 alarm

It determines alarm type. It is active if logic output function of Module-1 is an alarm output.

0000 Process high alarm
0001 Process low alarm
0002 Deviation high alarm
0003 Deviation low alarm
0004 Deviation band alarm.
0005 Deviation range alarm
0006 Heater failure alarm does not apply on these devices

AL 2 MODULE-2 Alarm-2 hysteresis value.

It is active if logic output function of Module-2 is an alarm output.

RON 2 Alarm on delay time (0, 9999)Seconds

It is active if logic output function of Module-2 is an alarm output

ROF 2 Alarm off delay time (0, 9998)Seconds

Alarm off delay time. It can be adjusted from 0000 to 9998 seconds. When the value is greater than 9998 LOUT, is seen on the display. It means alarm latching output is selected.

out3 ConF: Output-3 Configuration Parameters

OUT 3 Defines output function for Output-3

HEAT Heating
COOL Cooling
LOUT Logic output

CON 3 Defines control algorithm of Output-3.

It is active if output function of Output-3 is heating or cooling

ONOFF ON/OFF control algorithm
PID PID control algorithm

HYS 3 Hysteresis value for OUT-3. It can be adjusted from 0% to 50% of defined scale. (It is active if ON/OFF control is selected)
It determines operation form of hysteresis. (It is active if ON/OFF control is selected)

0000 SV+ HYS/2 and SV- HYS/2
0001 SV and SV+HYS or SV and SV-HYS

EN 3 In ON/OFF operation, this time must be passed for the output to be energised again. (It is active if ON/OFF control is selected)

LOUT 3 It determines logic output function of Output-3.

It is active if output function of Output-3 is Lout (Logic output)

0000 Alarm output
0001 Manual /Automatic data output
0002 Sensor break alarm output
0003 POutput is active when the process value is out of the band which is defined with minimum value of operating scale LOUT And maximum value of operating scale LOUT

0004 Output indicates that Ramp/Soak function has finished

0005 Sensor break alarm output for analogue input module in Module-1 or Module-2 socket. (It is visible if one of analogue input modules is plugged in Module-1 or Module-2 socket)

0006 If process value is less than minimum value of operating scale or for analogue input module in Module-1 or Module-2 socket or greater than maximum value of operating scale for analogue input module in Module-1 or Module-2 socket, process output becomes active. (This parameter is visible if one of the analogue input modules is plugged in Module-1 or Module-2 socket)

AL 5 Measurement input selection for Output-3 alarm output.

This parameter is visible if Logic output function of Output-3 is Alarm output and one of the analogue input modules is plugged in Module-1 or Module-2 socket

0000 Alarm output runs according to the process input
0001 Alarm output runs according to the analogue input module (2nd sensor input) in Module-1 or Module-2 socket.

AL 2 It determines alarm

It is active if logic output function of Output-3 is alarm output.

0000 Process high alarm
0001 Process low alarm
0002 Deviation high alarm.
0003 Deviation low alarm.
0004 Deviation band alarm.
0005 Deviation range alarm

0006 Isytic Arzas Alarmy. It is active if ~CT input module is plugged in Module-1 or Module-2 socket.

AL 3 Alarm-3 hysteresis value. (Scale 0% , scale 50%)Unit

It is active if logic output function of Output-3

RON 3 Alarm on delay time(0, 9999)Seconds

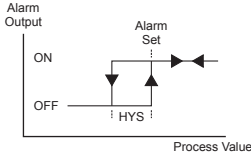
It is active if logic output function of Module-1 is alarm output.

ROF 3 Alarm off delay time (0, 9998)Seconds

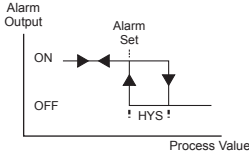
When the value is than 9998, LOUT is seen on the display. It means alarm latching output is selected. It is active if logic output function of Output-3 is alarm output.

Alarm Types

Process high alarm

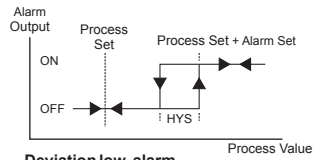


Process low alarm

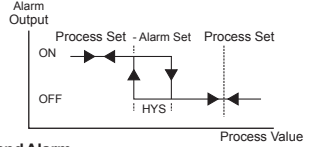


Alarm Types

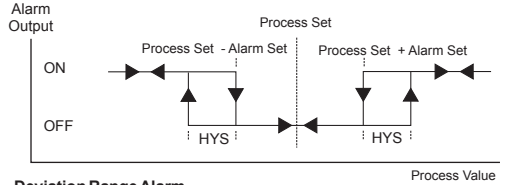
Deviation high alarm



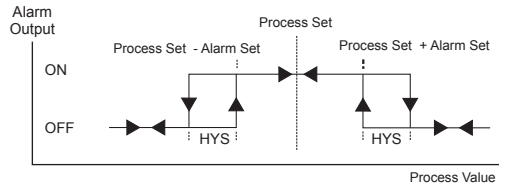
Deviation low alarm



Deviation Band Alarm



Deviation Range Alarm



Gen ConF: General Parameters

- SU-L** Minimum value for process set and alarm set values
- SU-U** Maximum value for process set and alarm set values
- SUL2** 2. Sensor Set Point Low Limit .sensor scale min. **SU-U2**)
2. Sensor Unit
Module-1 or Module-2 socket Analog Input Modules.
(If you have any of these parameters is observed)
- SUU2** 2. Sensor Set Point High Limit .sensor scale min. **SU-U2**)
2. Sensor Unit
Module-1 or Module-2 socket Analog Input Modules.
(If you have any of these parameters is observed)
- ULtt** While the motor is completely off the valve fully open
While the fully open or fully closed for the pass time required.
Value between 5 and 600 seconds can be entered.
(If motorized valve control is selected this parameter is active)
- ULHY** The minimum duration of the valve motor drive output (0.1, 5.0)%
Ultt = 100 sec and **ULHY** = %1.0 and the motor driving the
valve outlet. The minimum time to be active in $100 * 1.0\% = 1$ sec.
(If motorized valve control is selected this parameter is active)

Com ConF: Parameters for Configuration of Serial Communication

- SAdr** Communication Accessing Address (1,247)
Communication accessing address of device. It can be
adjusted from 1 to 247.
- bRud** Communication Baud Rate
- 0000** 1200 Baud Rate.
- 0001** 2400 Baud Rate .
- 0002** 4800 Baud Rate
- 0003** 9600 Baud Rate
- 0004** 19200 Baud Rate

Prty Parity Selection for Communication

- 0000 No parity.
- 0001 Odd parity.
- 0002 Even parity.

StPB Stop Bit Selection for Communication

- 0000 1 stop bit
- 0001 2 stop bit

PASS ConF: Operator and Technician Passwords

OPPS Operator Passwords (0, 9999)

It is used for accessing to the operator parameters. If it is 0000 ; no password protection while entering to the operator Parameters.

If it is different from "0" and user wants to access to the operator parameters;

- 1- If user does not enter [OPPS] password correctly :it turns to operation screen without accessing to parameters.
- 2- When [OPPS] in top display 0000 and in bottom display are seen, if user presses SET button without entering [OPPS] Password (For observing the parameters): Operator can see operator menus and parameters but operator can not change the parameters

TEPS Technician Passwords(0, 9999)

It is used for accessing to the technician parameters. If it is 0000 no password protection while entering to the technician Parameters.

If it is different from "0" and user wants to access to the technician parameters;

- 1- If user does not enter [TEPS] password correctly :it turns to operation screen without accessing to parameters.:
- When [TEPS] in top display 0000 and in bottom display are seen, if user presses SET button without entering [TEPS] Password (For observing the parameters): Operator can see operator menus and parameters but operator can not change the parameters.

Failure Messages



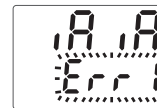
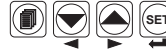
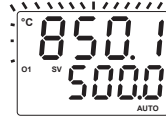
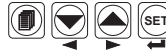
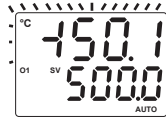
- 1 - Sensor failure in analogue inputs. Sensor connection is wrong or there is no sensor connection.



- 2- If parameter in "Disp List" menu is and analogue input module is plugged in Module-1 or Module-2 socket, this is sensor failure of analogue input module. Sensor connection is wrong or there is no sensor connection.



- 3-If parameter is and parameter is and analogue input module is plugged in Module-1 or Module-2 socket, this is sensor failure of analogue input module. Sensor connection is wrong or there is no sensor connection.



- 4- If top display blinks : If analogue input value is less than minimum value of operating scale [0.0] top display starts to blink.

- 5- If top display blinks : If analogue input value is greater than maximum value of operating scale [9.9] top display starts to blink.

- 6- If operator or technician password is different from "0" and user accesses to the parameter by Set button without entering the operator or technician password and wants to change a parameter, the warning message is shown on the bottom display as shown on the left. Device does not allow to do any changes without entering the password correctly.

- 7- If tuning operation can not be completed in 8 hours, AT led starts to blink. Blinking can be canceled by pressing Enter button.

- 8-If user does not do anything for 120 seconds while device is on operator or technician menus, device turns to operation screen.

- 9- The device is powered up, the normal does not begin to run, and the bottom of the screen As the side flashing; Module-1 and Module-2 slots, EMIX10 EMI-X30, X40-EMI, EMI-X50 Analog input modules installed at the same time the event occurs. The unit normal to return to work, the device energy cut-off and Analog Input one of the modules must be removed.

- 10- When power is on ; not starting the normal operation and blinking the bottom display as shown on the left; It appears when two analogue input modules (EMI-410, EMI-430, EMI-440, EMI-450) are plugged in Module-1 and Module-2 socket at the same time. For starting normal operation power off and pull out one of the analogue input modules.

Installation



Before beginning installation of this product, please read the instruction manual and warnings below carefully.

In package ,

- One piece unit
- Twopiece mounting clamp
- One piece instruction manual

A visual inspection of this product for possible damage occurred during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.

If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and separate the electrical connection of the device from the system.

The unit is normally supplied without a power switch or a fuse. Use power switch and fuse as required.

Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.

Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.

Never attempt to disassemble, modify or repair this unit. Tampering with the unit may result in malfunction, electric shock or fire.

Do not use the unit in combustible or explosive gaseous atmospheres.

During the equipment is putted in hole on the metal panel while mechanical installation some metal burrs can cause injury on hands, you must be careful.

Montage of the product on a system must be done with it's own fixing clamps. Do not do the montage of the device with inappropriate fixing clamps. Be sure that device will not fall while doing the montage.

It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

Warranty

Kessler-Ellis Products warrants that the equipment delivered is free from defects in material and workmanship. This warranty is provided for a period of two years. The warranty period starts from the delivery date. This warranty is in force if duty and responsibilities which are determined in warranty document and instruction manual performs by the customer completely.

Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts. Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

Other Information

Company Information:

Kessler-Ellis Products
10 Industrial Way East
Eatontown, NJ 07724

Phone: 800-631-2165 or 732-935-1320

Fax: 732-935-9344

Email: info@kep.com

Web: www.kep.com



This symbol is used for safety warnings. User must pay attention to these warnings.



This symbol is used to determine the dangerous situations as a result of an electric shock. User must pay attention to these warnings definitely.



This symbol is used to determine the important notes about functions and usage of the device

Ordering Information

Model Number

mL-PIDC6

Description

PID PROCESS CONTROLLER 48 X 96 1/8 DIN

100-240 VAC (-15%; +10%) 50/60Hz

Universal process input (TC, RTD, mV, V, mA) Additional 0/4 - 20 mA Input

RS-485 serial communication with Modbus RTU protocol

1 Form C Relay Alarm Output (5A @ 250VAC with Resistive Load)

1 Form A Relay Control Output (3A @ 250VAC with Resistive Load)

mL-PIDC8

Description

PID PROCESS CONTROLLER 96 X48 1/8 DIN

100-240 VAC (-15%; +10%) 50/60Hz

Universal process input (TC, RTD, mV, V, mA) Additional 0/4 - 20 mA Input

RS-485 serial communication with Modbus RTU protocol

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